



PLL_2020_259_R0
Northern Quarter, Wrexham

Light Impact Assessment
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1 GENERAL INFORMATION

1.1 Overview & Site Location

The Wrexham Glyndwr University Sports pitches are situated to the North West of Wrexham Town Centre. In an urban location, within the Wrexham Glyndwr University Campus.

The existing lighting for the sport pitches currently covers the field of play and the team benches. The surrounding car parks, pedestrian areas and roads are lit with specific road lighting units. So are not included into the Light Impact Assessment.

This document explains the extents of the flood lighting and its impact on the surrounding areas. More importantly, the proposed residential housing development, adjacent to the existing lighting installation.

Area of survey as shown on the sketch below



2 GENERAL SITE INFORMATION

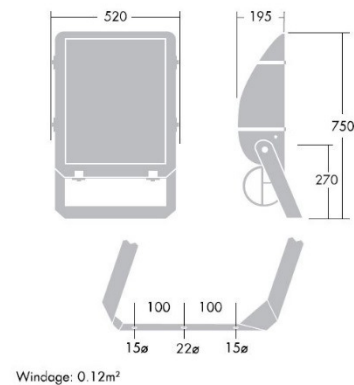
2.1 Existing Equipment

As there has not been a site survey. Educated assumptions have been made on the existing lanterns, for this scheme. The fittings have been identified as Thorn Troika Flood Lighting Fittings.

The lamps used by this fitting vary between 150W to 2000W. With the absence of exact information on the wattage for the fitting. An educated assumption would be that a 28 fitting scheme. Would require a 400W lamp, to meet the required levels for a sports pitch. The 400W fitting has been used to model the output calculations. This can be changed when exact information is available, but for the basis of this report the existing luminaires are fitted with 400W NAV/SON lamps.



Thorn Troika luminaire (Side)



Thorn Troika luminaire (Profiles)

The existing 'Thorn Troika' Double Asymmetrical luminaires are bracket mounted on assumed 16m static column using 1.0m to 4.0m tri and quad arm bracket, with the lanterns mounted at 45°. The fitting is a flat glass luminaire which provides a superior control of light (G6) which reduces light pollution. It is unclear of the operational times for the lighting. It would be the assumption that they are in operation through the hours of darkness up to the closure of the sports facility at night.

The four central columns have 4 lanterns mounted on each column. The four columns in the corner of the pitch have 3 lanterns mounted.

Overview of Flood Lighting Layout



Obtrusive light limitations for exterior lighting installations – general observers – ILP UK Recommendations 2011						
Environmental zone	Sky glow ULR (Max) %	Light intrusion (into windows) Ev (lux)		Luminaire intensity I candelas (cd)		Building luminance L (cd/m²)
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Pre-curfew
E0 IDA Dark Sky Parks, UNESCO Starlight Reserves	0	0	0	0	0	0
E1 Intrinsically dark landscapes National Parks, Areas of Outstanding Natural Beauty etc	0	2	0 (1*)	2,500	0	0
E2 Low district brightness Rural, small village, relatively dark urban location	2.5	5	1	7,500	500	5
E3 Medium district brightness Small town centres or urban location	5	10	2	10,000	1,000	10
E4 High district brightness areas Town/city centres with high night-time activity levels	15	25	5	25,000	2,500	25

ULR Upward light ratio of installation (maximum permitted percentage of luminaire flux that goes directly into the sky)

Ev Vertical illuminance in lux (Lumens/m²) – measured flat on glazing at centre of window

I Light source intensity in candelas (cd)

L Luminance in candelas per square metre (cd/m²)

Curfew Time after which stricter requirements for the control of obtrusive light will apply

* Permitted only from public road lighting installation

See Institution of Lighting Professionals *Guidance Notes for the Reduction of Obtrusive Light* 2011 – www.theilp.org.uk

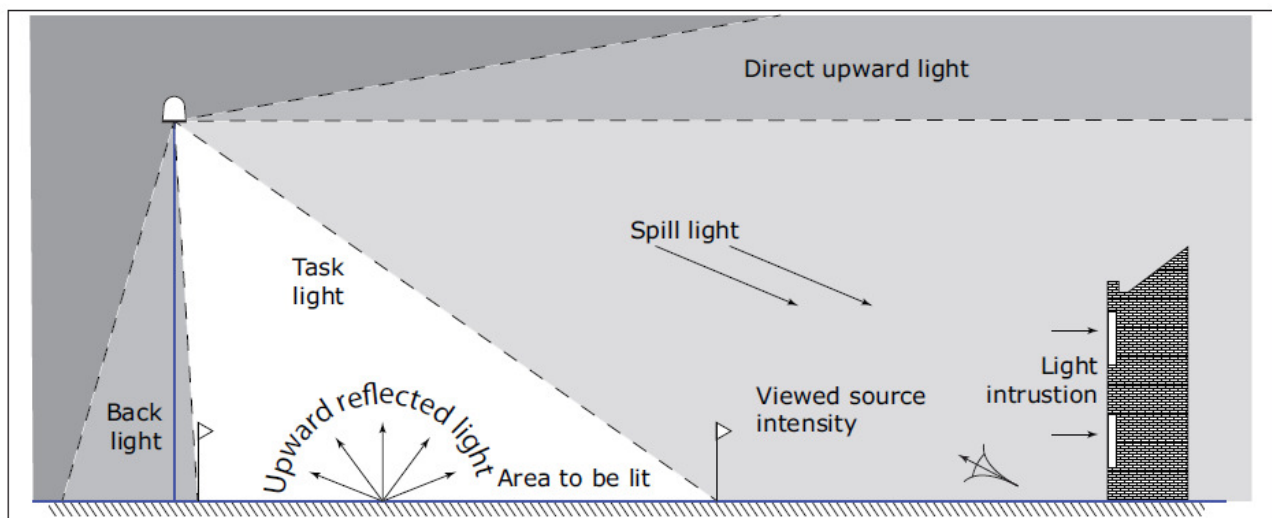
3.2 Obtrusive Light

Good lighting practice is the provision of the right light, at the right time, in the right place, controlled by the right system. Humanity's invention of artificial light and its application in the external environment has done much to safeguard and enhance our night-time environment but, if not properly controlled, obtrusive light (sometimes referred to as light pollution) can present serious physiological and ecological problems.

Obtrusive light – whether it keeps you awake through a bedroom window, impedes your view of the night sky or adversely affects the performance of an adjacent lighting installation – is a form of pollution, which may also be a nuisance in law and which can be substantially mitigated without detriment to the lighting requirements of the task.

Sky glow, the brightening of the night sky, glare the uncomfortable brightness of a light source when viewed against a darker background, light spill the spilling of light beyond the boundary of the area being lit and light intrusion (“nuisance light”) are all forms of obtrusive light which may cause nuisance to others, or adversely affect fauna and flora as well as waste money and energy.

Figure 2. Types of intrusive light



4 LEVELS OF LIGHT

4.1 Recommended Levels

As the installation has been in place for some years. The criteria is set to show the effect that the existing lighting has on the proposed development.

Environmental Class = E3 Medium district Brightness

ULR (Upward Light Ratio of the installation) = 5.0%

Light Intrusion (into Windows) Ev [Lux] – Pre Curfew (Dusk to 23:00hrs) = 10.0 Lux (Ev)
 – Post Curfew (23:00) = 2.0 Lux (Ev)

Ev= Vertical Illuminance in Lux - measured flat on the glazing at the centre of the window.

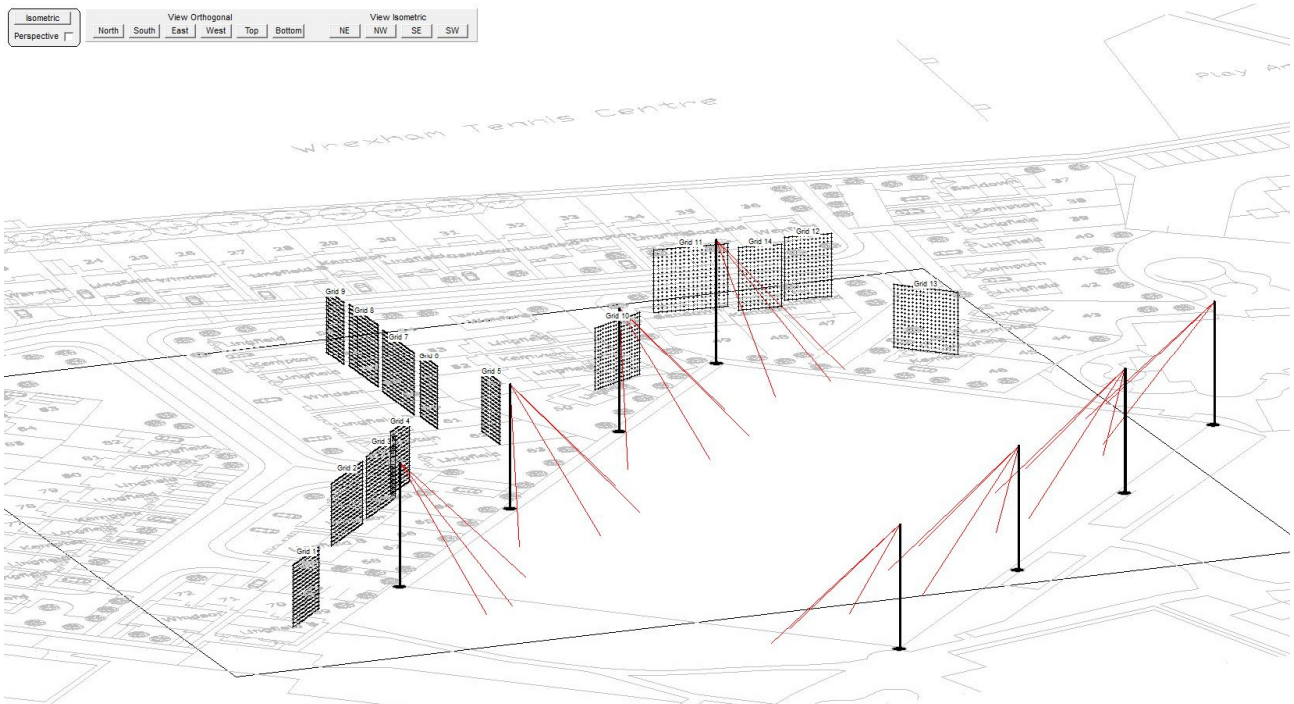
4.2 Lighting Calculations

There are two calculations provided:

PLL_2020_259_AREA1_R0 – This details the spill light from the existing flood lighting. The Ev Lux contours have been added to drawing PLL_2020_259_R0. To show the encroachment onto the housing development.

PLL_2020_259_AREA2_R0 – This details the Light Intrusion (into Windows) Ev [Lux] for each property adjacent to the sports pitches. A vertical grid has been added to the properties and measurements acquired for the upstairs and downstairs windows of the properties.

Figure 3. 3D View of the Vertical Measurement Grids



4.3 Levels Calculated

Table 1. Pre Curfew

Plot	Pre Curfew (Dusk to 23:00) = 10 Lux (Ev)	Pass / Fail
69	1.50	Pass
67 & 68	4.61	Pass
65 & 66	8.17	Pass
64	4.53	Pass
63	12.14	Fail
62	1.88	Pass
60 & 61	0.65	Pass
58 & 59	0.30	Pass
57	0.21	Pass
50	21.37	Fail
49	2.68	Pass
48	6.90	Pass
47	4.16	Pass
46	18.46	Fail

Table 2. Post Curfew

Plot	Post Curfew (23:00 to Dawn) = 2 Lux (Ev)	Pass / Fail
69	1.50	Pass
67 & 68	4.61	Fail
65 & 66	8.17	Fail
64	4.53	Fail
63	12.14	Fail
62	1.88	Pass
60 & 61	0.65	Pass
58 & 59	0.30	Pass
57	0.21	Pass
50	21.37	Fail
49	2.68	Fail
48	6.90	Fail
47	4.16	Fail
46	18.46	Fail

5 CONCLUSION AND RECOMMENDATIONS

It should be noted that the flood lighting installation, pre-housing development is fit for purpose. It has flat glass fittings for good light control. The fitting has no upward light above the fitting (G6), limiting Sky Glow. Also low column heights (16m), for a flood lighting arrangement have been used to minimise spill light.

It is unclear of the operational times for the lighting. It would be the assumption that the lighting is operational through the hours of darkness. Up to the closure of the sports facility at night, assumed 23:00hrs.

If the flood lighting is operational past the Post-curfew (23:00hrs) cut off. This would have a larger impact on the proposed development. A greater number of properties are effected and are shown in table 2, as a failure to meet the required levels.

There are remedial effects that could be taken to reduce the light spill into the properties. Cowls and shields could be fitted to the existing flood lights. Changing the fitting to an LED light source, would increase control and reduce spill light, into the development. Also reduce energy consumption for the sports facility.

Dimming could be applied that may reduce the light spill. This unfortunately may have an adverse effect on the light on the playing surface.

A rearranging of the properties on the development and higher fencing, shielding and planting could be used to limit light spill into the development.

A Baseline, pre-development lighting survey may be useful. This data can then be used to help isolate which luminaires might need to be removed, where screening should be implemented or establish a new Illuminance limit reduced below existing levels.

REFERENCES:

Lighting Design:

PLL_2020_259_AREA1_R0

PLL_2020_259_AREA2_R0

Drawing

PLL_2020_259_R0